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Hierarchical Storage Management, year 2022

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Agenda

- Simpler

- Scalability

- Data Integrity

- Data Management

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Simpler

It's complicated to set up

- GUI Configuration
- Disaster Recovery configurations
  - Currently complicated to set up
  - Variety of ways of doing the same thing
  - This should be, will be point & click
  - HA configurations likewise complicated
- HSM Appliance
  - Variety of NAS/SAN storage appliances exist
- Media Migration
  - Make easier to adopt next generation tape/disk
  - Cadence is still every 2-3 years

SPEED LIMIT

$2x=(360\div4)$

SOLVE FOR x

Scalability

Moore's law has not been overturned by the courts

- Disk
    - No particular end in sight in disk growth
    - Expect 2.5 doublings of disk in 10 years
    - 50's of petabyte disk systems
- Tape
    - Expect 5 doublings of tape in 10 years
    - Oracle T10000C – 5 TB @ ¼ GB/sec – fairly awesome amount of data
    - Horizontally scale tape I/O
    - Will make use of partitioning to pack/recycle data
- Files
    - 1B files was last years problem
    - Need administrative scalability too (dump/restore/scanning/…)

Scalability

- Hostless Operations
  - Push tasks out towards devices, libraries
  - Data integrity validation scanning
  - Tape-to-tape copy: 2nd copy of files, media migration

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Data Integrity – Self Repair

We don't have time for manual repair

- End to end data integrity
  - Not just tape scanning
  - User → channel → disk → daemon → tape → 2nd copy →…and back
- Automated Data Integrity Validation
  - Done without recalling data (today)
  - Automate by policy
- Self repair when problems found

Data Location & Management

It's not just disk and tape

- Multiple pools of different kind
    - LOC outlined 6-7 tiers
    - Fast disk, bulk disk, SSD, big tape, small tape, long-term archving
    - Cloud
- Data placement on tiers based on general guidelines
    - High capacity/cheap, high performance, super available/redundant
    - Don't care where data is, just as long as goals met
- Automation
    - Automatically migrate between tiers
- Data import/export
    - Simple data exchange
    - LTFS, version n+2

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Call to Action

Mountains of Data

- There will be 2.5 to 5 doublings of data in next 10 years
- Automate
- Virtualize
- Simplify
- Integrity checking / self healing
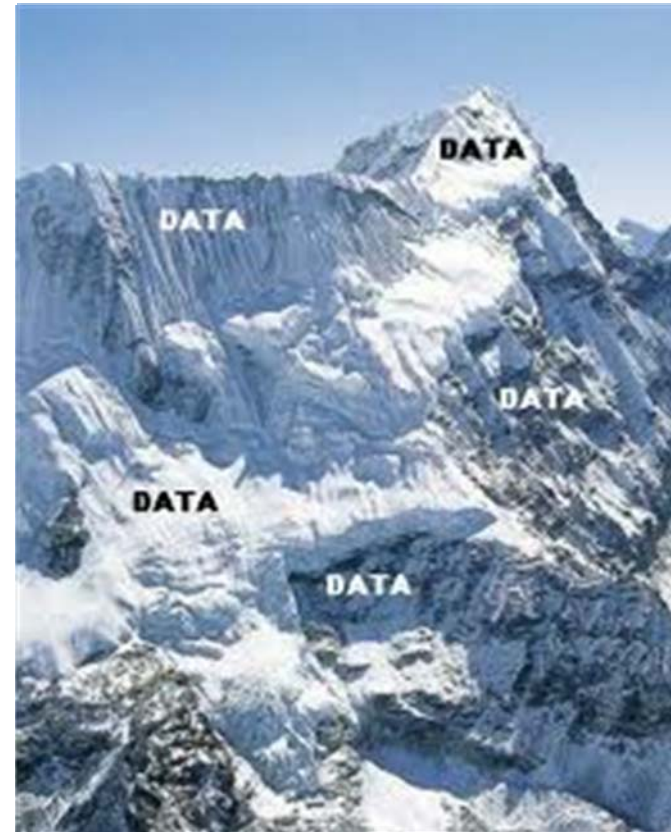
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